VIRTUAL REALITY - CAT 1

GROUP G

BCSC01/0003/2021 CYNTHIAJOY MWENDE

BCSC01/0010/2021 PETER WAGUCHU WAINAINA

BCSC01/0019/2021 JOHNSON KANYI

BCSC01/0042/2021 MICHAEL MOUNDE

A) APPLICATIONS OF VR AND AR

- 1. **Entertainment**

VR and AR provide real-time animation and motion capture enabling creators to built interactive animated shows and live stream events easier and of high quality. Companies such as Flipside XR and Disney Movies VR has revolutionized the way media content is made nowadays.

- 2. **Education**

It is applied in the education sector by enabling students to learn in an immersive , experimental way from anywhere in the world. Companies like Tech Row enable students to go on a space mission to Pluto, explore Antarctica and experience the wonder of Machu Picchu; one can also be takedn on a journey of the human body as a white blood cell.

A) APPLICATIONS OF VR AND AR

- **3. Gaming**

Used in the gaming industry to provide immersive game experiences in games such as "Beat Saber" and 'Half-Life-Alyx“

- **4. Automotive Industry**

Engineers and designer use VR/AR to easily model and experiment the look and build of vehicles before commissioning expensive prototypes. Companies such as Honda and BMW have been using this for years to hold design and engineering reviews to find new alternatives to traditional clay models.

A) APPLICATIONS OF VR AND AR

- **5. Healthcare**

Medical professionals use VR/AR for training and preparation whether as a junior doctor explaining diagnoses and treatment plans or as an orthopedic surgeon. Companies like Osso VR enable surgeons to interact with medical VR devices to practices surgery on virtual bodies. VR/AR can also be used as therapy for treatment for mental health issues such as PTSDs and phobias.

- **6. Architecture and Real Estate**

Used to help architects and clients visualize building in 3D before construction and for virtual property tours in real estate. Companies like Stucco is using VR/AR for home staging.

A) APPLICATIONS OF VR AND AR

- **7. Retail & E-commerce**

  VR/AR enables virtual try-ons (makeup, clothing) and visualization of furniture or products in real-world settings.

- **8.Manufacturing & Maintenance**

  AR guides technicians during equipment repairs with real-time instructions and overlays.

- **9. Marketing**

  AR is applied in campaigns for interactive advertisements, AR games, and apps like Pokémon Go.

B) CONSIDERATIONS FOR VR/AR COMPANIES

- **1. Market Research(target audience)**

  Understand your target audience and their demands for VR/AR solutions by identifying and assessing VR/AR potential sectors where it could be valuable.

- **2. Technology and Infrastructure**

  Investment of high quality VR/AR hardware and software is required for modelling, motion tracking etcetera. The success of the startup will heavily depend on the quality of the immersive experience provided by the VR/AR infrastructure and technology used.

B) CONSIDERATIONS FOR VR/AR COMPANIES

3. Legal and Compliance (regulations)

One should be aware and ensure to comply with all legal and regulatory requirements in the VR/AR industry. Intellectual property rights as well as data protection and privacy of users should be adhered to.

4. Funding(Cost)

Securing adequate financial resources to cover initial setup costs, ongoing expenses and potential scaling.

5. Team Building (Skilled Labor)

Assemble a skilled team with expertise in VR/AR development, marketing and business management

B) CONSIDERATIONS FOR VR/AR COMPANIES

- **6. UI/UX**

  Differentiate your offering by creating unique, comfortable and engaging VR/AR user experience that can stand out as VR/AR adoption hinges heavily on the usable, comfortable and intuitive user interfaces.

- **7. Partnerships**

  Forge relationships with hardware manufacturers, content creators, and distributors to broaden your company's reach.

C) HUMAN FACTORS IN VR/AR

- **1. User Comfort and Ergonomics**

  Extended use of VR/AR devices can cause discomfort including eye strains, fatigue, neck and back pains etcetera. Ensuring comfortable design and limiting session duration is vital.

- **2. Accessibility**

  VR/AR systems should be accessible to all users including those with physical and cognitive disabilities. One should include options for different control schemes to ensure content is usable by all persons.

- **3. Cognitive load**

  Design interfaces that are intuitive and easy to learn and use as well as experiences that are engaging but not overwhelming. A balance between immersion and simplicity must be maintained

C) HUMAN FACTORS IN VR/AR

- **4. Social Interaction**

  Extended VR use can create a sense of detachment from the real world, which may impact social and psychological well-being. Features that help users remain grounded, such as "virtual breaks," can be important.

- **5. Cybersickness**

  Some users experience dizziness or nausea due to a disconnect between what the eyes perceive and the body’s motion. To reduce this, VR applications must minimize motion-to-photon latency and avoid sudden movements.

D) ERGONOMICS OF AR/VR

- **1. Posture and motion**

  AR/VR experiences should encourage good posture and natural body movement by designing interactions that don't require excessive reaching or awkward positions. This help reduce neck and back pain as well as eye strain etcetera.

- **2. Cybersickness Prevention**

  Reducing the lag between head movements and visual updates, using smoother animations, and avoiding fast camera movements is essential to help prevent cybersickness

- **3. Visual Ergonomics(Field of View)**

  Proper calibration of the display to match the user's interpupillary distance is essential to prevent eye strain and visual fatigue.

D) ERGONOMICS OF AR/VR

- **4. Headset and AR/VR device comfort**

  They should be lightweight and well balanced to reduce neck and head strain. Adjustable strap and padding can be used to enhance comfort during prolonged use.

- **5. Environmental Awareness**

  Users in VR are disconnected from their real-world surroundings, which can lead to accidents. Incorporating boundaries or alert systems (like Oculus Guardian) helps users remain safe.

E) VR/AR DISPLAY DEVICES

- **1. Oculus Rift / Meta Quest (VR):** Offers an immersive experience for gaming and entertainment. Meta Quest 2 is a standalone, wireless VR device with a vast content library.
- **2. HTC Vive (VR):** Exhbits high-resolution displays and room-scale tracking
- **3. PlayStation VR (VR):** Compatible with the PlayStation console, it offers an affordable yet powerful VR experience for gamers.
- **4. Microsoft HoloLens (AR):** Used for industrial applications such as remote collaboration, design, and engineering.

VR/AR DISPLAY DEVICES (PART 2)

- **5. Magic Leap:** Enterprise-focused AR with spatial computing
- **6. Google Cardboard:** Budget-friendly, smartphone-based VR
- **7. Varjo XR-3:** High-end mixed-reality device for simulations
- **8. Samsung Gear VR:** Portable, affordable mobile VR
- **9. Pimax:** Wide field of view for immersive experiences